SUMMARY OF MINERAL OCCURRENCES ON ANNETTE ISLAND

MAP OCATION			COMMENTS	
1	Occurrence	Au	Quartz veins in pyritic argillite	
2	Occurrence	Cu	Disseminated chalcopyrite in metavolcanic schist	
3	Occurrence	Au	Quartz-calcite-pyrite veins	
4	Occurrence	Pb, Cu	Disseminated pyrite, pyrrhotite, galena, chalcopyrite	
5	Occurrence	Au, Cu, Pb	Disseminated pyrite in diorite	
6	Occurrence	Ag	Quartz-calcite-pyrite veins	
7	Occurrence	Au, Cu	Quartz-calcite-pyrite veins	
8	Occurrence	Au, Ag, Cu	Disseminated pyrite and quartz-pyrite veins	
9	Occurrence	Au	Vuggy quartz veins	
10	Prospect	Au	Abundant quartz and quartz-pyrite veins	
11	Occurrence	Pb, Cu	Malachite, disseminated pyrite, quartz-calcite-pyrite veins	
12	Occurrence	Au, Ag, Cu, Pb, Mo, Cr, Ni	Pyritic greenstone and microgabbro with quartz and calcite veins	
13	Occurrence	Ag, Cu	Disseminated pyrite and chalcopyrite, common quartz veins	
14	Occurrence	Au, Ag	Galena in quartz-calcite fissure veins	
15	Occurrence	Pb	Galena in calcite veinlets	
16	Occurrence	Cu	Disseminated chalcopyrite	
17	Occurrence	Cu, Pb	Base-metal sulfides in quartz veins	
18	Occurrence	Cu	Chalcopyrite in quartz-carbonate veins	
19	Prospect	barite, Ag, Pb, Zn	Barite veins in brecciated rhyolite, disseminated sulfides	
20	Occurrence	Ag, Pb, Zn, barite	Sheared phyllite, greenstone,rhyolite and limestone with quartz-barite veins	
21	Occurrence	Ag, Pb, Zn, barite	Barite pods and barite-calcite veins in dolostone and in sheared rhyolite	
22	Occurrence	Ag, Pb, Zn, barite	Quartz-calcite-barite-sulfide veins in sheared rhyolite conglomerate	
23	Occurrence	Ag, Pb, Zn, barite	Quartz-calcite-barite veins with galena and sphalerite	
24	Occurrence	Ag, Cu, Pb, Zn, barite	Quartz-barite-sulfide veins in greenstone, carbonate rocks,rhyolite and trondjhemite	
25	Occurrence	Au	Gold in quartz veins, traces of gold in beach placer	
26	Occurrence	Au, Ag, Cu, Pb	Quartz veins in sheared trondjhemite	
27	Occurrence	Au	Quartz veins with clots of pyrite, galena, and chalcopyrite	
28	Occurrence	Au, Cu, Pb, Zn	Disseminated sulfides in sheared metarhyolite	
29	Occurrence	Au, Ag, Cu, Pb, Zn	Gold and sulfide bearing-quartz veins in rhyolite	
30	Prospect	Au, Ag, Cu, Pb, Zn	Quartz veins in rhyolite	
31	Prospect	Au, Ag, Cu, Pb, Zn	Quartz veins in brecciated rhyolite	
32	Occurrence	Ag, Pb, Zn, barite	Quartz veins in dolostone and at dolostone-rhyolite contact	
33	Prospect	Ag, Pb, Zn, barite	Quartz pods and veins and quartz-calcite-barite veins in carbonate and rhyolitic rock	
34	Occurrence	Ag, Pb	Pyrite and galena in quartz veins in thrust fault	
35	Occurrence	Au, Ag, Cu, Pb, Zn	Ladder and stringer quartz veins in limestone and dolostone near rhyolite contact	
36	Occurrence	Au, Ag, Pb, Zn	Sulfides in dolostone and limestone at rhyolite contact	
37	Occurrence	Au, Cu	Pyrite and chalcopyrite in quartz veins, disseminated pyrite and chalcopyrite in volcaniclastic rocks	
38	Occurrence	Fe, Co, Mo	Mineralized shear zones in granite rocks	
39	Occurrence	Au, Ag, Cu	Quartz-calcite veins with sulfides in granitic rock	
40	Occurrence	Pb	Quartz veins with galena in foliated trondjhemite	
41	Occurrence	Fe, Mo	Quartz veins and gossan in foliated trondjhemite	
42	Occurrence	Cu	Disseminated chalcopyrite in trondjhemite	
43	Occurrence	Au, Mo	Disseminated sulfides and pyrite-magnetite veins in sheared granitic rock	
44	Occurrence	Au, Ag, Mo	Disseminated pyrite and hematite and seams of massive sulfides in sheared granitic rock	
45	Occurrence	Au, Ag, Cu, Mo	Disseminated sulfides in aplite dike	
46	Occurrence	Cu	Disseminated pyrite and chalcopyrite in schist and hornfels	
47	Occurrence	Cu	Disseminated pyrite and chalcopyrite in schist	
48	Occurrence	Cu	Pyrite, chalcopyrite, and arsenopyrite in sheared fine-grained schist with calcite veinlets	
49	Occurrence	Cr, Pt	Disseminated magnetite and chromite in massive, serpentinized dunite	
50	Occurrence	Cr	Disseminated magnetite and chromite and chromite stringers in serpentinized dunite	
51	0	C	Durito and chale ansuita atria core in calling and anning	

EXPLANATION

Pyrite and chalcopyrite stringers in schist and gneiss

1	Bedding	attitud
1	Calladian.	

Foliation
Fold axis --

Fold axis -- antiformal or anticlinal fold
Contact, dashed where inferred

Fault, dashed where inferred
 Thrust fault, dashed where inferred

Thrust fault, dashed where inferred, sawteeth on upper plate

Mineral occurrence, numbers correspond to

Map Number in table

Data point -- location of sample for which data is provided in table

Alaska Annette Island

MAP AND TABLE OF MINERAL DEPOSITS ON ANNETTE ISLAND, ALASKA

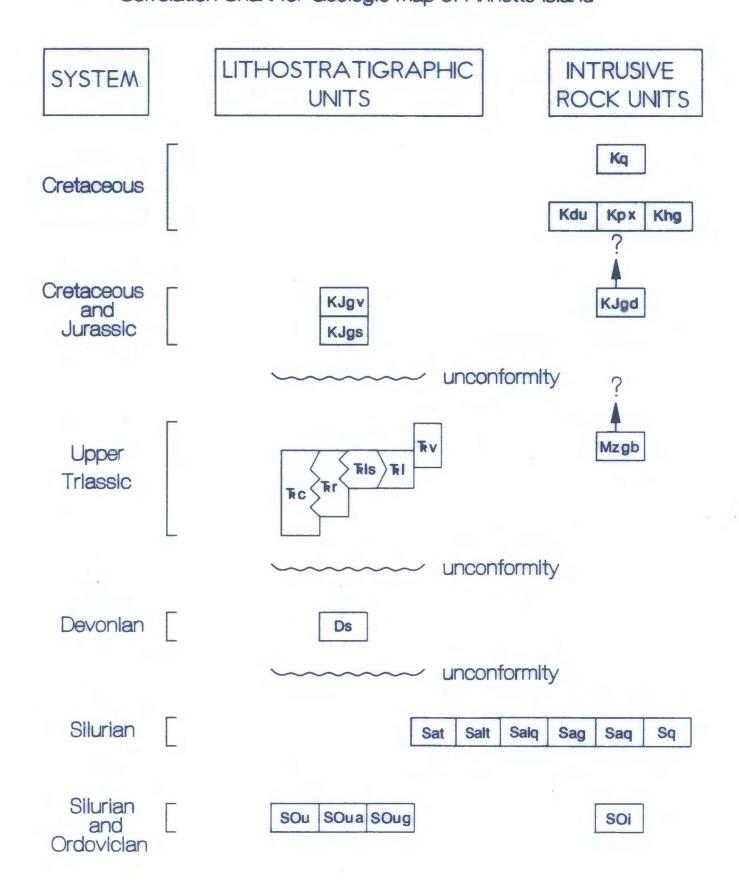
Island

By

Susan M. Karl

1992

Correlation Chart for Geologic Map of Annette Island



Map Units

- Kq Quartz diorite (Cretaceous) -- Brownish-gray, medium-grained, sheared and hydrothermally altered quartz diorite consisting of albite, chlorite, muscovite, epidote-clinozoisite, calcite, quartz, apatite, sphene, and pyrite. K/Ar age of 89 Ma is from muscovite (Berg and others, 1988).
- Kdu Dunite (Cretaceous) -- Yellow- to orange-weathering, dark greenish-black, medium- to coarse-grained, serpentinized olivine dunite, with minor amounts of magnetite and chromite as disseminations and veinlets. Near margins up to 5 per cent clinopyroxene in dunite. Age of 106 to 134 Ma inferred from regional correlations (Berg and others, 1988).
- Kpx Pyroxenite (Cretaceous) -- Yellow- to orangeweathering, dark greenish- to brownish-black, serpentinized diopsidic clinopyroxenite with minor disseminated magnetite and chromite; forms dikes, lenses and irregular masses in dunite (Kdu). Age of 106 to 134 Ma inferred from regional correlations (Berg and others, 1988).
- Khg Hornblende gabbro (Cretaceous) -- Dark grayish-green weakly foliated, fine-grained hornblende gabbro consisting of 70 per cent hornblende, 25 per cent plagioclase, and accessory magnetite, clinozoisite, and sphene. Age inferred from association with dunite
- KJgd Diorite and quartz diorite (Cretaceous or Jurassic) -Greenish-gray and white, medium-grained, locally
 porphyritic diorite and quartz diorite. Pluton is
 pervasively hydrothermally altered. Mafic minerals
 altered to actinolite-chlorite-epidote; plagioclase
 replaced by epidote-albite-sericite-quartz. Accessory
 minerals include apatite, sphene, and pyrite.
 Considered to be cogenetic with volcanic rocks of unit
- KJgv Intermediate to mafic volcanic rocks (Cretaceous and Jurassic) -- Foliated and massive green sub-alkaline to tholeiitic intermediate to mafic metavolcanic rocks, consisting of flows, breccia, and tuff. Unit includes subordinate gray, green, and black phyllite and graywacke semischist. Regionally metamorphosed to greenschist grade. Correlative with Gravina Island Formation (Berg and others, 1988).
- KJgs Sedimentary and volcaniclastic rocks (Cretaceous and Jurassic) -- Basal dark gray argillite matrix conglomerate and calcareous phyllite grade up to graywacke turbidites with intercalated tuff and debris flows. Regionally metamorphosed to greenschist grade. Correlative with Gravina Island Formation (Berg and
- Mzgb Gabbro (Mesozoic) -- Dark, dull green, locally rusty weathering medium- to coarse-grained hornblende gabbro. Interstitial plagioclase pervasively altered to clinozoisite. Dikes and plugs in the vicinity of Sylburn Peninsula; possibly feeders to Trv. Contains copper and iron sulfides and no magnetite.
- Trv Volcanic and volcaniclastic rocks (Triassic) -- Dark green, mafic to intermediate volcanic rocks, consisting of a sequence of alternating pillow basalt, agglomerate, breccia, aquagene tuff, marine volcaniclastic rocks, and minor lenses of limestone and interpillow limestone. Calcareous, matrix-supported conglomerate with mainly volcanic clasts overlies pillow basalt near top of unit. Correlated with Chapin Peak Formation on Gravina Island (Berg and others, 1988); assigned to Hyd Group by Gehrels and others (1987).
- Trls Limestone and siltstone (Triassic) -- Dark gray, carbonaceous and locally pyritic bedded limestone and calcareous siltstone. Unit contains minor pebbly limestone andcalcareous grit to cobble conglomerate with clasts of felsic volcanic rock. Fossils from the Sylburn Peninsula yield early, middle and late Norian ages (Berg and Cruz, 1982; Savage and Gehrels, 1987). Unit correlates in part with Nehenta Formation on Gravina Island (Berg and others, 1988); assigned to Hyd Group by Gehrels and others (1987).
- Trl Limestone (Triassic) -- Light gray-weathering, medium to dark gray thick-bedded to massive limestone.

 Gradationally underlies limestone and siltstone unit (Trls). Conodonts from Sink Lake and Kwain Bay provide a Late Triassic age (Berg, 1980). Locally hydrothermally dolomitized. Assigned to Hyd Group by Gehrels and others, 1987).
- Trr Rhyolite (Triassic) -- Light gray to light green, locally rusty-weathering, banded rhyolite, rhyolite breccia, and tuff, with dominantly subaerial, subordinately submarine, volcaniclastic rocks. Relict flow lamination, spherulitic, vitroclastic, fragmental, and porphyro-aphanitic textures are locally well -preserved. Local disseminated pyrite or limonite; local sericitic alteration. Correlated with Puppets Formation on Gravina Island (Berg and others, 1988); assigned to Hyd Group (Gehrels and others, 1987).
- Trc Conglomerate and breccia (Triassic) -- Light green, brown, gray, and orange, massive to bedded polymictic fragmental rocks. Lensis of fragmental rocks to 20 meters thick contain clasts up to 1/2 meter diameter of trondjhemite, quartz diorite, greenstone, and minor limestone near the base of the unit, and grade upward to felsic tuff breccia. Unit depositionally overlies Annette pluton and Paleozoic metamorphic rocks. Unit correlates in part with Nehenta Formation on Gravina Island (Berg and others, 1988); assigned to Hyd Group by Gehrels and others (1987).

- Ds Sedimentary rocks (Devonian) -- Dull olive gray, brownor reddish-weathering, pyritic phyllite, calcareous
 siltstone, graywacke, feldspathic to arkosic siltstone
 and sandstone, grit, and conglomerate, and dolomitic,
 arenaceous or phyllitic limestone. Contains Devonian
 and middle Devonian megafossils (Berg and Cruz, 1982).
 Regionally metamorphosed to greenschist grade.
 Correlated with Karheen Formation of Prince of Wales
 Island (Gehrels and others, 1987).
- Sag Granite of the Annette pluton (Silurian) -- White to buff, medium-grained, hypidiomorphic granite with less than 5 percent interstitial chlorite after biotite.

 Minor phase of Annette pluton which yielded U-Pb ages ranging from 409 to 424 Ma (Gehrels and others, 1987).
- Sat Trondjhemite of the Annette pluton (Silurian) -- Light gray, medium-grained, equigranular trondjhemite, gradational to leuco-trondjhemite (Salt) and leuco-quartz diorite (Salq) phases of the Annette pluton. Composed of sodic plagioclase, quartz, perthite, microcline, and less than 10 percent mafics (biotite and hornblende). Locally hydrothermally altered: plagioclase to sericite and mafic minerals to chlorite. K-Ar and U-Pb ages range from 409 to 424 Ma (Berg, 1972; Smith and Diggles, 1981; Gehrels and others,
- Salt Leuco-trondjhemite of the Annette pluton (Silurian) -light gray, fine- to medium-grained leuco-trondjhemite.
 Less than 5 percent mafic minerals. Locally
 hydrothermally altered. Phase of Annette pluton which
 has yielded U-Pb ages of 409 to 424 Ma (Gehrels and
 others, 1987).
- Salq Leuco-quartz diorite of the Annette pluton (Silurian)
 -- Light gray, fine- to medium-grained inequigranular
 leuco-quartz diorite with subordinate quartz diorite
 and diorite. Composed of plagioclase, quartz, biotite
 and hornblende. Mafics less than 5 percent for
 leucocratic phases; up to 25 percent for dioritic
 phases. Border phase of Annette pluton which has
 yielded U-Pb ages of 409 to 424 Ma (Gehrels and others,
- Saq Quartz diorite of the Annette pluton (Silurian) -Light gray and green medium-grained quartz diorite with
 15 to 30 percent mafic minerals. Plagioclase shows
 sericitic alteration. Green hornblende, subordinate
 and rare augite are altered to chlorite. U-Pb ages for
 this phase of the Annette pluton range from 430 to 390
 Ma (Gehrels and others, 1987).
- Quartz diorite and diorite (Silurian?) -- Medium-gray, medium-grained, inequigranular, hypidiomorphic quartz diorite and diorite. Hornblende is intergrown with plagioclase; quartz is interstitial. Hornblende, commonly altered to epidote and chlorite, ranges from 20 to 40 percent of rock. There are no isotopically determined ages for this unit.
- Diorite (Silurian or Ordovician) -- Dark green, mediumgrained, inequigranular diorite. Mafic minerals 30 to 40 percent and entirely altered to chlorite and oxides or sulfides. Unit displays pervasive sericitic alteration. Relict accessory minerals include apatite and sphene. Metamorphic assemblage includes quartz, albite, chlorite, epidote-clinozoisite, sericite, calcite, leucoxene, hematitie, magnetite, and pyrite. Unit is intruded by the Annette pluton and has yielded U-Pb ages of 415 and 426 Ma (Gehrels and others, 1987).
- SOu Volcanic, sedimentary, and intrusive rocks, undivided (Silurian and Ordovician) -- Heterogenous assemblage of metamorphosed and highly deformed mafic to intermediate and minor felsic volcanic rocks, clastic and carbonate rocks, and subordinate mafic to intermediate intrusive rocks. Intrusive rocks are presumably dikes of units SOi, Sq, and Sat. Volcanic rocks are dominant and consist of calc-alkaline pillow basalt flows with minor interpillow red chert, pillow breccia, and mafic to intermediate agglomerate, breccia, and tuff. Interbedded with volcanic rocks are tuffaceous carbonate rocks, massive to bedded marble, calcareous conglomerate, graywacke, and dark gray phyllite. Ubiquitous minor disseminated sulfides. Greenschist facies metamorphic mineral assemblage includes chlorite, epidote-clinozoisite, albite, actinolite, sericite, calcite, dolomite, quartz, hematite, and
- Soua Amphibolite facies volcanic, sedimentary and intrusive rocks, undivided (Silurian and Ordovician) -- Unit Sou overprinted by amphibolite facies metamorphism on the Metlakatla Peninsula. Hornfels, schist and gneiss textures accompanied by mineral assemblage including plagioclase, blue-green hornblende, brown biotite, epidote-clinozoisite, chlorite, actinolite, sericite, calcite, almandine garnet, staurolite(?), and potassium feldspar. Timing of metamorphism inferred to be related to ultramafic intrusion at Yellow Hill.
- Soug Greenschist facies volcanic, sedimentary, and intrusive rocks (Silurian and Ordovician) -- Metamorphic rocks of unit Soua are retrograded to greenschist facies in some places on the Metlakatla Peninsula. The mineral assemblage includes chlorite after biotite, epidote and clinozoisite after metamorphic amphibole and plagioclase. Albite-quartz-prehnite veinlets postdate retrogressive metamorphism. Retrograde minerals and textures are attributed to Late Cretaceous regional metamorphism.

This map is preliminary and has not been reviewed for conformity with U.S. Geological Survey editorial standards or with the North American Stratigraphic Code. Any use of trade, product, or firm names is for descriptive purposes only and does not imply endorsement by the U.S. Government